Program :

#include<iostream>

#include<string.h>

#include<conio.h>

using namespace std;

struct student{

int roll\_no;

char name[15];

float mark;

}s;

void create\_database(student s[],int n);

void reply(student s[],int n);

void display\_data(student s[],int n);

void bubble\_sort(student s[],int n);

void insertion\_sort(student s[],int n);

void quick\_Sort(student s[],int low,int high);

void linearSearch(student s[],int n,int key);

void binarySearch(student s[],int n);

int main(){

struct student s[20];

cout<<"\t\t\tWELCOME"<<endl;

int response,n;

while(true){

cout<<"\n1]Create a student database"<<endl;

cout<<"2]Display the student database"<<endl;

cout<<"3]Bubble sort the data by roll no"<<endl;

cout<<"4]Sort names by insertion sort"<<endl;

cout<<"5]Quick sort the marks"<<endl;

cout<<"6]Linear search on marks"<<endl;

cout<<"7]Binary search on names"<<endl;

cout<<"8]Exit"<<endl;

cout<<"\nEnter the task = ";

cin>>response;

switch(response){

case 1:

cout<<endl;

cout<<"Enter the number of students = ";

cin>>n;

create\_database(s,n);

break;

case 2:

cout<<endl;

display\_data(s,n);

break;

case 3:

cout<<endl;

bubble\_sort(s,n);

break;

case 4:

cout<<endl;

insertion\_sort(s,n);

break;

case 5:

quick\_Sort(s,0,n-1);

cout<<"\n\*\* Information sorted succesfully !! \*\*"<<endl;

reply(s,n);

break;

case 6:

int key;

cout<<"Enter the marks to be found = ";

cin>>key;

linearSearch(s,n,key);

break;

case 7:

binarySearch(s,n);

break;

case 8:

return 0;

default:

cout<<"Enter the correct choice"<<endl;

}

}

return 0;

}

void create\_database(student s[],int n){

cout<<endl;

for(int i=0;i<n;i++){

cout<<"Student "<<i+1<<" :"<<endl;

cout<<"Enter the name = ";

cin>>s[i].name;

cout<<"Enter the roll no = ";

cin>>s[i].roll\_no;

cout<<"Enter the marks = ";

cin>>s[i].mark;

cout<<endl;

for(int j=i-1;j>=0;j--){

if(s[i].roll\_no==s[j].roll\_no){

i--;

cout<<"enter the unique roll no."<<endl;

break;

}

}

}

}

void reply( student s[],int n){

char re;

cout<<"Want to display sorted data y or n = ";

cin>>re;

cout<<endl;

if(re=='y'){

display\_data(s,n);

cout<<endl;

}

else{

return;

}

}

void display\_data(student s[],int n){

cout<<"Roll no: "<<"\t\tName: "<<"\t\t\tMarks: "<<endl;

for(int i=0;i<n;i++){

cout<<s[i].roll\_no<<"\t\t\t"<<s[i].name<<"\t\t\t"<<s[i].mark<<endl;

}

cout<<endl;

cout<<"\* Information displayed succesfully !! \*"<<endl;

cout<<"\nPress any key to move further";

getch();

cout<<endl;

}

void bubble\_sort(student s[],int n){

student temp;

int counter = 1;

while (counter <n){

for(int i=0;i<n;i++){

if(s[i].roll\_no>s[i+1].roll\_no){

temp = s[i];

s[i] = s[i+1];

s[i+1] = temp;

}

}

counter ++;

}

cout<<endl;

cout<<"\* Information sorted succesfully !! \*"<<endl;

reply(s,n);

}

void insertion\_sort(student s[],int n){

student key;

for(int i =1;i<n;i++){

key=s[i];

int j=i-1;

while(j>=0 && strcmp(s[j].name,key.name)>0){

s[j+1]=s[j];

j=j-1;

}

s[j+1]=key;

}

cout<<"\* Information sorted succesfully !! \*"<<endl;

reply(s,n);

}

int partition (student s[], int low, int high) {

int pivot = s[high].mark;

int i = (low - 1);

for (int j = low; j <= high - 1; j++)

{

if (s[j].mark < pivot)

{

i++;

;

student temp;

temp = s[i];

s[i]=s[j];

s[j]=temp;

}

}

student temp1;

temp1=s[i+1];

s[i+1]=s[high];

s[high]=temp1;

return (i + 1);

}

void quick\_Sort(student s[], int low, int high) {

if (low < high)

{

int pi = partition(s, low, high);

quick\_Sort(s, low, pi - 1);

quick\_Sort(s, pi + 1, high);

}

}

void linearSearch(student s[],int n, int key){

bool flag=true;

cout<<"Roll no: "<<"\t\tName: "<<"\t\t\tMarks:"<<endl;

for(int i =0;i<n;i++){

if(s[i].mark==key){

cout<<s[i].roll\_no<<"\t\t\t"<<s[i].name<<"\t\t\t"<<s[i].mark<<endl;

flag=false;

}

}

if(flag){

cout<<"NA"<<"\t\t\t"<<"NA"<<"\t\t\t"<<"NA"<<endl;

cout<<"No data found of entered marks"<<endl;

}

cout<<"/nPress any key to continue ";

getch();

}

void binarySearch(student s[],int n){

insertion\_sort(s, n);

cout<<endl;

string key;

cout<<"Enter the name to be found = ";

cin>>key;

cout<<endl;

int start = 0;

int end = n ;

bool flag=true;

cout<<"Roll no: "<<"\t\tName: "<<"\t\t\tMarks: "<<endl;

while( start <= end){

int mid = (start + end)/2;

if(s[mid].name==key){

flag=false;

while(s[mid].name==key){

cout<<s[mid].roll\_no<<"\t\t\t"<<s[mid].name<<"\t\t\t"<<s[mid].mark<<endl;

mid--;

}

while(s[mid].name==key){

cout<<s[mid].roll\_no<<"\t\t\t"<<s[mid].name<<"\t\t\t"<<s[mid].mark<<endl;

mid++;

}

return;

}

else if(s[mid].name<key){

start=mid+1;

}

else{

end=mid-1;

}

cout<<"\nPress any key to continue "<<endl;

getch();

}

if(flag){

cout<<"NA"<<"\t\t\t"<<"NA"<<"\t\t\t"<<"NA"<<endl;

cout<<"No data found of entered marks"<<endl;

}

cout<<endl;

}

OUTPUT :

WELCOME

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 1

Enter the number of students = 4

Student 1 :

Enter the name = g

Enter the roll no = 1

Enter the marks = 90

Student 2 :

Enter the name = s

Enter the roll no = 2

Enter the marks = 78

Student 3 :

Enter the name = a

Enter the roll no = 7

Enter the marks = 56

Student 4 :

Enter the name = r

Enter the roll no = 1

Enter the marks = 67

enter the unique roll no.

Student 4 :

Enter the name = r

Enter the roll no = 6

Enter the marks = 89

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 2

Roll no: Name: Marks:

1 g 90

2 s 78

7 a 56

6 r 89

\*\*\* Information displayed succesfully !! \*\*\*

Press any key to move further

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 3

\*\*\* Information sorted succesfully !! \*\*\*

Want to display sorted data y or n = y

Roll no: Name: Marks:

1 g 90

2 s 78

6 r 89

7 a 56

\*\*\* Information displayed succesfully !! \*\*\*

Press any key to move further

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 4

\*\*\* Information sorted succesfully !! \*\*\*

Want to display sorted data y or n = y

Roll no: Name: Marks:

7 a 56

1 g 90

6 r 89

2 s 78

\*\*\* Information displayed succesfully !! \*\*\*

Press any key to move further

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 5

\*\*\*\* Information sorted succesfully !! \*\*\*\*

Want to display sorted data y or n = y

Roll no: Name: Marks:

7 a 56

2 s 78

6 r 89

1 g 90

\*\*\* Information displayed succesfully !! \*\*\*

Press any key to move further

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 6

Enter the marks to be found = 56

Roll no: Name: Marks:

7 a 56

/nPress any key to continue

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit

Enter the task = 7

\*\*\* Information sorted succesfully !! \*\*\*

Want to display sorted data y or n = y

Roll no: Name: Marks:

7 a 56

1 g 90

6 r 89

2 s 78

\*\*\* Information displayed succesfully !! \*\*\*

Press any key to move further

Enter the name to be found = s

Roll no: Name: Marks:

Press any key to continue

2 s 78

1]Create a student database

2]Display the student database

3]Bubble sort the data by roll no

4]Sort names by insertion sort

5]Quick sort the marks

6]Linear search on marks

7]Binary search on names

8]Exit